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28 October 1981

# Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 120



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28 October 1981

# WORLDWIDE REPORT

## NUCLEAR DEVELOPMENT AND PROLIFERATION

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## PACT WITH EEC OPENS DOOR TO EXTENSIVE DEALS IN URANIUM

### Safeguards Accord

Canberra THE AUSTRALIAN in English 21 Sep 81 p 13

[Article by Laura Veltman]

[Text]

THE way to multi-million-dollar uranium deals between Australia and rich EEC countries will be opened today when the Government signs a uranium safeguards agreement with the Community.

Already one such deal has been publicly announced, involving uranium contracts between Energy Resources of Australia (ERA) and West Germany.

Department of Trade and Resources sources have indicated a number of other deals will soon be announced between Australia-based companies and the EEC.

The agreement will be signed by the Australian Ambassador to the EEC, Mr Roy Fernandez, and the EEC's Vice-president for External Relations, Mr Haferkamp, in Brussels.

Official sources said yesterday that a serious hitch in negotiations had been the free transfer of goods between the nine EEC countries.

This system of free trade is directly opposed to Australia's usual uranium policy, which insists that exported uranium remain with the buyer country and not be resold elsewhere.

But the problem of transfers was overcome in the agreement by the EEC being treated as a single entity.

This was acceptable to the Australian Government because all EEC countries are signatories to international nuclear-safeguards agreements, including Britain and France, the two nuclear weapon-producing countries of the EEC.

The agreement therefore provides that the uranium will be used only for non-weapon purposes.

The agreement has been under negotiation since 1978 by the Departments of Foreign Affairs and Trade and Resources.

ERA, part-owned by West German interests, has not yet begun mining uranium, and shipments will not start until next year.

## ALP Opposition to Pact

Canberra THE AUSTRALIAN in English 23 Sep 81 p 2

[Article by Laura Veltman]

[Text]

THE Federal Opposition denounced yesterday a uranium safeguard agreement which has doubled the uranium export market.

The agreement with the European Economic Community was hailed by the Government as a major step forward in relations with the member countries but the ALP says it is a dangerous capitulation on the uranium policy.

Government sources say they expect the agreement to lead to the announcement soon of a number of multi-million-dollar uranium contracts with EEC countries.

It has already made possible a contract between West Germany and Energy Resources of Australia Ltd.

The ALP's spokesman on environment and conservation, Mr Stewart West, said the agreement would not prevent Australian uranium being used for the nuclear weapon industries of two EEC countries, Britain and France.

Mr West claimed France's enrichment plant, the only such plant in the EEC, would process uranium bought by

other EEC countries.

The Government had "sold out" because of tough competition among uranium-producing countries.

The agreement was signed in Brussels on Monday by the Ambassador to the EEC, Mr R. Fernandez, and the Vice-president of the Commission of the European Community, Mr W. Haferkamp.

It took three years to conclude the agreement. The main hitch was Australia's usual requirement that its uranium remain in the country to which it is exported.

However, the free transfer of goods between the 10 EEC countries is considered a basis of their economic relationship.

The problem was overcome by treating the EEC as a single entity after Australia was satisfied its uranium safeguards requirements would be met by international nuclear pacts to which the EEC countries are signatories.

Australia now has bilateral uranium safeguards agreements with Finland, the Philippines, South Korea, Sweden, France, Canada, the United States, the UK and the EEC.

CSO: 5100/7503

# AUSTRALIAN URANIUM NOW 17 PERCENT OF WEST'S KNOWN RESERVES

Canberra THE WEEKEND AUSTRALIAN in English 26-27 Sep 81 p 29

[Text]

AUSTRALIA'S nuclear industry now has more of the world's uranium reserves than it did last year, according to the latest figures.

The Australian Atomic Energy Commission announced yesterday that Australia's uranium resources now represented 17 per cent of the West's known reserves.

Australian mines can economically recover a total of about 294,000 tonnes of uranium, worth about \$80 a kilogram, which is a drop of 5000 tonnes on the commission's 1980 figures.

The commission accounts for this drop by saying the cost of uranium mining and processing has risen, making some deposits which were previously regarded as economic propositions now too expensive.

It also said about 2000 tonnes of uranium was mined and processed by

the industry last year.

But reserves of uranium which can be mined at higher prices have increased as more discoveries are made.

Uranium recoverable at between \$80 and \$130 a kilogram now totals 21,000 tonnes.

The commission figures show that the world's known, recoverable reserves of \$80 a kilogram uranium fell by 7 per cent in the past year.

Reserves in the US fell 37 per cent.

The commission said the US must now be considered a potential customer for cheap Australian nuclear fuel.

American industry now has 134,000 tonnes less uranium which can be mined and milled at economic prices.

The commission also estimates there are additional reserves of cheap uranium in Australia.

Its figure for these "estimated additional

resources" has jumped 58,000 tonnes to a total of 284,000 tonnes.

Australia, Canada and the US share most of the Western world's uranium reserves.

Mining experts say that Australia's uranium can be mined within today's cost ranges and using proven mining and processing technology.

Australia's nuclear industry came under strong criticism last month by the ACTU, which claimed it was "headed for economic catastrophe".

The trade union body singled out the Atomic Energy Commission for criticism because the nuclear body advocated the construction of a uranium enrichment plant in Australia.

But the latest figures, with their adjustment of world uranium reserves, casts doubt on the ACTU's predictions of a collapse in the Australian nuclear industry.

lian nuclear industry.

"We can expect the big investors to move on in good time, or appeal for help to their sympathetic friends in government," the ACTU said in its criticism of the industry.

"But meanwhile workers will have uprooted themselves and their families to travel to remote locations with dangerous working conditions, with the prospect of early sackings as the contracts fail to materialise, causing the mines to cut down their output or close down altogether."

The suggestion that falling prices would make it difficult for Australian uranium to compete on an international buyers' market does not take in to account the likely rise in the cost of mining and processing in other countries, which could make local deposits attractive investments.



GOVERNMENT WILL FLY OUT URANIUM TO BYPASS UNION BOYCOTTS

Sydney THE SYDNEY MORNING HERALD in English 23 Sep 81 p 1

[Article by Paul Kelly]

[Text]

**CANBERRA.** — The Federal Government is prepared to fly uranium ore out of Australia, using military assistance if necessary, according to Cabinet papers.

The Government has contingency plans if the trade-union movement, notably the Seamen's Union of Australia and the Waterside Workers' Federation, move to prevent shipments from Australian uranium producers in the Northern Territory.

The plans are alluded to in a Cabinet document obtained in Canberra last night which was presented to Cabinet last autumn by the Minister for Industrial Relations, Mr Viner.

It is the same document which outlines Mr Viner's attitude towards the deregistration of the Builders Labourers' Federation, which has put the minister into political trouble (Above).

It shows that Mr Viner — with the support of senior ministers — is determined that uranium shipments proceed regardless of trade-union opposition and that the union movement must be defied on this issue at all costs.

The document says: "The activity of some unions (specifically

the SUA and WWF) is still inhibiting Australian uranium producers (Energy Resources of Australia, Queensland Mines and Mary Kathleen Uranium) from shipping uranium overseas in fulfilment of contractual obligations.

"We now have set a fairly clear course on this whole question.

"It is proposed that the companies be encouraged to test as fully as possible normal commercial means of shipping uranium.

"If this is blocked then it is proposed to act without delay to get the ore moved by air charter.

"If this cannot be done, obviously the question of military assistance will be raised.

"I share the view that the Government should, in a quiet and businesslike way, let it be seen that the uranium shipments will go forward irrespective of what union attitudes may be.

"I see value in being able to point to the fact that no matter what some unions are saying uranium is in fact being developed, mined and exported.

"This is the reality of the situation and it is the best practical argument to press on the community and the union movement."

GOVERNMENT PROBING RADIATION FROM FRENCH ATOLL NUCLEAR TESTS

Canberra THE WEEKEND AUSTRALIAN in English 26-27 Sep 81 p 4

[Article by Wio Joustra]

[Text]

THE Federal Government is making urgent inquiries into allegations that French nuclear tests have caused serious radiation leaks in Pacific waters for several years.

But the Prime Minister, Mr Fraser, yesterday ruled out any early action against France, because of a lack of information. He said that in the absence of information it would be premature to canvass courses of action.

Mr Fraser was replying to an attack on France's underground nuclear tests at Mururoa Atoll, made in Parliament by the Opposition spokesman on foreign affairs, Mr Bowen.

Mr Bowen asked whether the Government was aware that as a result of recent atomic tests it was not safe for people to swim in surrounding waters.

He said there had been reports that a 30-60cm crack had been opened by the nuclear blasts along an 800m stretch of the atoll below sea level. The reports indicated serious leaks of radioactivity had been oc-

curring in the waters of the Pacific for several years.

Mr Bowen said this gave Australia strong grounds to again successfully institute action against France in the International Court of Justice at The Hague.

In his reply, Mr Fraser said the Government was aware that on August 12, the authorities in French Polynesia issued a communique declaring the beach in the eastern part of Mururoa Atoll temporarily closed.

The reason given was the possibility that "residues of the atmospheric tests conducted prior to 1975" might have been deposited there after a period of bad weather.

The communique said "the temporary situation that has been created is a result of atmospheric testing and had no link with the underground testing that has been carried out since 1975".

Mr Fraser said: "The Government has no information concerning any serious leaks of radioactivity in the waters of Mururoa Atoll."

"Nor does it have information which supports the suggestion that, due to venting, a

large gap has been opened in the atoll below sea level."

But he said that in the light of Mr Bowen's information the Government was making urgent inquiries.

Australia's continued opposition to the French nuclear testing program was firmly on record with the French Government.

These views had been conveyed to France frequently, most recently in discussions in Paris in June between the Minister for Foreign Affairs, Mr Street, and the French Foreign Minister, Mr Cheysson.

Australia also supported the resolution adopted by the recent meeting of the South Pacific Forum in Vanuatu.

This reaffirmed the forum's strong condemnation of nuclear weapons testing and urged France immediately to cease its program and provide full details of the effects of past testing activities on Pacific people and the environment.

The issue is almost certain to be raised by Pacific members at next week's Commonwealth Heads of Government Meeting in Melbourne.

# BEEF NOT AFFECTED BY RADIOACTIVE WATER FROM BEN LOMOND

Brisbane THE COURIER-MAIL in English 27 Sep 81 p 11

[Text]

## **THE Water Resources Minister, Mr Tomkins, yesterday accused Senator Jones (Lab., Qld) of making "alarming and disgusting" statements about alleged radioactivity in north Queensland waterways.**

Mr Tomkins said Senator Jones "had been sold a pup" for his maiden speech in the Senate.

His attempts were "grossly inaccurate and inflammatory," Senator Jones said: Contaminated water from ore stockpiles at the Ben Lomond uranium mine near Charters Towers had polluted the Burdekin River and some creeks.

Senator Jones claimed this could be the cause of radioactive beef being exported, unless there were stricter safeguards.

Mr Tomkins said despite meticulous precautions taken with the Ben Lomond stockpile, some leakage of contaminated water had occurred.

"But it had never posed any threat either to human or animal life," he said.

Departmental water quality officers had monitored the situation and tests showed the pollution level only a fraction of that internationally accepted for drinking water.

Water quality tests and analyses covered the Burdekin River, some creeks and the Charters Towers water supply.

Senator Jones said yesterday that north Queensland cattlemen had expressed concern at the possibility of radioactive contamination of watercourses by leakage from the Ben Lomond uranium mine.

Unless stringent safeguards were enforced, the Burdekin River system faced contamination from lead, copper, cadmium and zinc as well as radioactive material, he said.

"The fact is that during the last wet season a substantial leakage occurred from the uranium ore stockpile at Ben Lomond," Senator Jones said.

"The next wet is due in a few months.

"The consequences of a slowly developing leak at Ben Lomond would be the pollution of the Burdekin system. Damming the river would ensure that heavy pollutants would accumulate in the reservoir," he said.

"Any proposal that puts the Burdekin River at risk of radioactive contamination cannot be justified in terms of the limited economic significance of the Ben Lomond deposit."

CSO: 5100/7503

## AUSTRALIA

### BRIEFS

**LICENSE FOR MINATOME**--The controversial Minatome uranium project near Charters Towers in north Queensland may get the green light after direct discussions between the French-owned company and the state Mines Department. An application for an extra lease needed for the commercial exploitation of the uranium deposit at Ben Lomond, was refused by the Charters Towers Mining Warden in April. But the Mines Minister, Mr Gibbs, said last night that Minatome Australia Pty Ltd was working on a detailed report that could overcome the warden's objections. If department experts agreed with the company findings, a recommendation could be made to Cabinet. The Mining Warden, Mr Eric Lendich, recommended against the granting of the lease because of the lack of detailed geological and hydrological information about the site of a proposed tailings dam. Mr Gibbs said the company was investigating the geology of the area. "They probably should have done it before they applied for the lease," he said. "They had a lot of information, but not the detail that the warden needed." [Text] [Brisbane THE COURIER-MAIL in English 28 Sep 81 p 1]

**DEMOCRATS' ANTI-URANIUM STAND**--All Australian Democrat Parliamentarians were urged yesterday to use their influence to halt the uranium industry in Australia. This was one of the resolutions passed at the party's national conference in Brisbane. It sought to discontinue the uranium industry until safeguards in regard to mining, power generation, waste disposal with costing and security were considered safe. [Excerpt] [Brisbane THE COURIER-MAIL in English 28 Sep 81 p 3]

**VANUATU ANTI-NUCLEAR POLICY**--The Prime Minister of Vanuatu, Mr Lini, will ask the Commonwealth Heads of Government Meeting to call for the decolonisation of all French territories in the Pacific. Mr Lini said yesterday he believed the decolonisation question to be of the utmost importance to South Pacific countries. "It is impossible to have stability in the region while the situation in the French territories continues to exist," he said. Mr Lini also plans to raise at CHOGM the possibility of a nuclear-free zone in the Pacific and to call for a ban on nuclear testing and dumping. It is understood Vanuatu has the support of most Commonwealth Pacific countries for its efforts to ban nuclear tests and dumping. Countries backing the move are Australia, New Zealand, Fiji, Kiribati and Papua New Guinea. But it is unlikely to attract strong support for its moves to create a nuclear-free zone. Australia, New Zealand, Canada and Britain, who have nuclear-powered submarines, are certain to strongly oppose this. Mr Lini said yesterday that the Pacific countries were "very much against" nuclear

testing by the French and plans by the United States and Japan to dump low-level waste material in the Pacific near Tuvalu. "But we are not so united on independence for New Caledonia or the nuclear-free zone. Vanuatu will of course press its views on these matters, which are well known," he said. [Text]  
[Melbourne THE AGE in English 29 Sep 81 p 4]

CSO: 5100/7504



## APPLICATION FOR U.S. URANIUM SHIPMENT EXPLAINED

Madras THE HINDU in English 9 Sep 81 p 9

[Article by N. Raa]

[Text]

WASHINGTON, Sept 8

India has filed an application for licence to export from the United States yet another shipment of 19.86 tonnes of low-enriched uranium fuel for the Tarapur nuclear power plant.

This move—which is in accordance with a schedule drawn up by two U.S. Government officials, Messrs Kefer and Last, following a visit to India in late 1976—is clearly meant to build up a technical-legal case against the United States for continuing to renege on an agreement that is still in force.

The 1963 bilateral agreement has the force of an international treaty. Although some U.S. commentators have asserted this is not the case, the issue is free from ambiguity. As Indian legal analysts have noted, Article 27 of the Vienna Convention on the Law of Treaties (1969) proclaims that "a party may not invoke the provisions of its internal law as justification for its failure to perform a treaty."

And the convention defines a treaty to mean "an international agreement concluded between States in written form, whatever its particular designation."

The new application is for nuclear fuel that should, by contractual obligation, be delivered between March and September 1982. Supply of some 30.72

tonnes of uranium is still "pending"—19.86 tonnes applied for in August 1979, approved by the U.S. Congress in September 1980, but withheld by two administrations and an identical quantity for which an application was made on September 24.

All these applications for licence to export have been made as per the Kefer-Last report. It offered a schedule that did not satisfy India (since it established lower levels than for other foreign buyers of American nuclear fuel), but was accepted as a practical guide for action to gain the minimum quantity at the intervals fixed by the U.S. side.

The United States has (as is well known) informed the Government of India—over two rounds of negotiations—that it is not in a position to continue the Tarapur supply relationship. It has thus far insisted upon the continuance of safeguards on the Tarapur reactors as well as on the spent fuel after the termination of the 1963 agreement.

India, on the other hand, has announced that it cannot entertain safeguards or any other surviving obligations after the life of the relationship and especially after the U.S. side has unilaterally broken it.

Aids from building upon a legal case that is already believed to be strong, the exercise draws attention

to two features of the Tarapur supply relationship. The first is the impressively rising delay curve that seems directly to express the decline and fall of the relationship.

According to data assembled by India's Atomic Energy Commission, the time taken by the United States (executive branch plus Nuclear Regulatory Commission plus Congress) in processing applications for the low-enriched uranium fuel has risen from a zero level in 1973 to 20 weeks in 1975 to 49 weeks in 1975-76 to 89 weeks in 1975-77 to 104 weeks in 1978-80 and to 104 weeks (so far) in the case of the shipment approved by Congress, whose delivery has been refused by the administration.

The second is the problem of finding in time a satisfactory replacement for the fuel supplied by the United States—for a station whose importance in a major region is said to be nothing short of "strategic".

The Government of India appears to have informed the United States that it has ruled out any external supply of low-enriched uranium for Tarapur, and plans to run the reactors on indigenously developed mixed oxide fuel. The question, of course, is whether this will be really adequate for the interim period which is likely to prove a testing time for Tarapur.

## DROPP IN OUTPUT FROM RAJASTHAN NUCLEAR PLANT REPORTED

Bombay THE TIMES OF INDIA in English 13 Sep 81 p 9

[Text]

NEW DELHI, September 12 1,048.29 million units in 1980.

(UNI).

**P**OWER generation from the first unit of the Rajasthan atomic power 200 million units from 1,251.55 million units in 1979 to 1048.29 million units last year.

The situation this year is expected to be more or less the same because of the frequent shut-downs due to various factors.

In the last five years, power generation from the first unit improved only by about 150 million units from 900.52 million units in 1976 to

The reasons for the shortfall in production are malfunctioning of equipment, grid problems and human error, according to official sources.

The working of unit one is engaging the attention of the department of atomic energy.

The recent leakage of about eight tonnes of heavy water out of an inventory of 210 tonnes from the unit's reactor system has further necessitated urgent action.

Most of the leaked heavy water has been recovered, purified and fed back into the system.

The situation at Tarapur is no better. Due to non-supply of enriched uranium by the United States, the power generation has been restricted to about 160 Mw, against the capacity of 210 Mw.

The generation at Tarapur has been gradually reduced from 2,294.44 million units in 1976 to 1,793.67 million units in 1980.

CSO: 5100/7002

## AEC CHAIRMAN SPEAKS AT VIENNA CONFERENCE

Bombay THE TIMES OF INDIA in English 24 Sep 81 p 7

[Text]

BOMBAY, September 23: India today condemned the "unprovoked and unjustified" military attack by Israel on the Iraqi nuclear research centre, at the 25th general conference of the International Atomic Energy Agency, being held in Vienna.

Dr. H. N. Sethna, chairman of the Atomic Energy Commission, who is leading the Indian delegation, told the conference that the "aggression" had threatened international peace and security, in clear violation of the U.N. charter. Also, it was an aggression by one member of the agency against another member and hence, deserved "strong action" at this session of the general conference.

A copy of Dr. Sethna's speech at the session was released to the press here today.

Expressing India's concern over the attempts to erode the basic objectives of the IAEA as enshrined in its statute, Dr. Sethna opined that the best way to commemorate the silver jubilee of the IAEA was to once again recall the original objectives and not to allow extraneous issues erode these values.

## INDIAN CONTRIBUTION

The agency's technical assistance scheme had been made, subject to restrictive considerations in recent years, and India had renounced the acceptance of technical assistance but she would continue to participate in the scheme as a donor, he added. He reiterated that India would make a voluntary contribution of \$97,600 to this scheme and would make available 12 fellowships for the benefit of the developing countries.

Referring to the deliberation on the proposed international plutonium storage, Dr. Sethna said India participated in the deliberations with an "open mind." He recalled the Indian view point, stated at the time of its accession to the statute, that the member countries had sovereign rights to decide on their own programme.

"We find that the present discussions are proceeding in a direction that may infringe on the sovereign rights of members and our participation in these discussions is, therefore, without prejudice to our rights as a sovereign nation," Dr. Sethna pointed out.

CSO: 5100/7005

## BRIEFS

**NUCLEAR REACTOR PLANS**--Work on the two nuclear reactors at Kakrapar near Surat in Gujarat at a cost of Rs 382.52 crore will be completed within a period of 125 months from the date of financial sanction, the Lok Sabha was informed on Wednesday, reports PTI. A site selection committee has been set up to make recommendations for the other four reactors of 235 MWs each, proposed to be set up in the country during the Sixth Plan (1980-85) period, Minister of State for Science and Technology C.P.N. Singh told Mr Pius Tirkey in a written reply. [Text] [New Delhi PATRIOT in English 10 Sep 81 p 5]

**U.S. THREAT DENIED**--New Delhi, Sept. 17--Mr C.P.N. Singh, Minister of State for Science and Technology, denied in the Rajya Sabha today that the U.S. Government had threatened the Government of India with economic sanctions if it carried out a second nuclear test, report PTI and UNI. He told Mr Shiva Chandra Jha that the Tarapur atomic plant had received nuclear fuel containing approximately 5923 kg of U-235, against a total quantity of not exceeding 14,500 kg of U-235 till the contract period, which ends in 1993. He reiterated the Prime Minister's assertion that the Tarapur plant would be kept working with alternative means, irrespective of further fuel supplies from the U.S.A. [Excerpt] [Calcutta THE STATESMAN in English 18 Sep 81 p 9]

CSO: 5100/7003

## PAKISTAN

### BRIEFS

**NUCLEAR ENERGY PROGRAM**—Lahore, 6 October (JASARAT Report)—Pakistan's atomic energy commission chairman, Munir Ahmad Khan, has warned that if nuclear technology is not obtained our foreign reserves will be completely depleted within the next 4 years. The only thing we can do then is to import oil. In a detailed interview with the monthly URDU digest, he reiterated that Pakistan will continue to pursue its peaceful nuclear energy program. He said we are aware of the dangers threatening our peaceful nuclear energy program in the form of Israel and Indian opposition. He added: Despite India's psychosis regarding our nuclear program, the fact is that India signed an agreement with Canada in 1962 on the Rajasthan powerplant. He said that Pakistan's atomic energy commission was set up 11 years after the establishment of Pakistan, whereas India had set up its nuclear institute in 1948. He said the first reactor in Asia was in India in 1956, even before Japan. Our country is not aware of the meager resources we will have left 10 years from now. [Excerpts] [GF111924 Karachi JASARAT in Urdu 7 Oct 81 p 1]

CSO: 5100/4502



# PROGRAM COST TO DATE PLACED AT 210 BILLION CRUZEIROS

Rio de Janeiro JORNAL DO BRASIL in Portuguese 20 Sep 81 p 28

[Article by Jorge Oliveira: "Nuclear Escalation Has Cost the Country 210 Billion Cruzeiros"]

[Text] Ten years and 210 billion cruzeiros after beginning what to some is nothing more than a foolhardy venture and to others is a reaffirmation of national sovereignty, Brazil this week enters the select club of countries that generate atomic energy. The reactor core of Angra 1, the Alvaro Alberto power plant, began receiving its fuel elements yesterday. On Tuesday the first Brazilian nuclear plant begins producing the steam that in December will power its generators.

Announced in 1967, in a statement made by then President Costa e Silva at Punta del Este, the Brazilian desire to compensate for a presumed impossibility of meeting its needs in the 1980's with hydroelectric power materialized 4 years later in the purchase from Westinghouse Corporation, of the United States, of a single nuclear plant--the one that is now being started up.

Today, however, due to an agreement signed with the FRG in 1974, Brazil wants to have eight nuclear plants by 1995, for which it is willing to spend \$18 billion, according to Nuclebras, the corporate giant created to implement the program. But other estimates, backed by ELETROBRAS [Brazilian Electric Power Companies, Inc], show a final cost of not less than \$26 billion, nearly half the nation's current net foreign debt.

Ironically, activation of the first Brazilian nuclear power plant occurs in a year during which, because of an economic slowdown due mainly to its huge foreign debt, Brazil cannot even use all the energy generated by its hydroelectric facilities. It comes, furthermore, at a time when the country is assured of having enough electric power to meet its needs until the end of this decade, even if energy consumption again begins growing at 10 percent annually.

But now the ambitious Brazilian nuclear program is being given a new set of clothes: it is being presented by the government as the factor that will assure the nation the complete and indispensable mastery of nuclear technology without which it would be at a disadvantage relative to its neighbors, particularly Argentina. Therein, in fact, lies the basis of the argument, although at no point did it enter into the speech with which former President Geisel announced the agreement he had signed

with the FRG, the great inspiration for which had been the spectacular increase in petroleum prices.

In the "white paper" he distributed in an effort to explain details of the agreement, the then president predicted that the first Angra dos Reis plant, purchased from Westinghouse in 1972 with only 8 percent domestic components, would be operating in 1978; the two German plants, in 1982 and 1983.

Six years later, none of the former president's forecasts has been confirmed. Petroleum consumption fell [sic] from 1,122,846 barrels a day in 1979 to 1,131,226 in 1980 (through May of this year, it was 979,211 barrels a day). Domestic petroleum production increased from 165,825 barrels a day in 1979 to 191,512 barrels in 1980 (in May of this year it was 224,637 barrels a day, a situation that has remained unchanged).

The petroleum crisis, after the significant price increases beginning in 1973, caused a mad scramble by developing countries dependent almost wholly on outside suppliers to seek alternative sources.

Brazil, for example, sought in alcohol a substitute for gasoline, causing a drop in the latter's consumption of 30 percent to 18 percent in the last 2 years. At present, to give some idea, consumption of carburetant alcohol is 300 million liters a month. Consumption in 1979 was 2,235,000,000 liters and in 1980 was 2,648,000,000 liters.

#### Electric Power

The growth rate of electric-power consumption estimated for this year by ELETROBRAS will be 50 percent less than that of last year: it should have grown, according to forecasts, at 10 percent a month [sic; year?] and it has actually gained a little more than 5 percent.

The nation's energy production last year was the equivalent of \$9 billion, about equal to petroleum imports. According to the 1980 ELETROBRAS report, domestic energy consumption [sic; production?] in 1980 was 120,720 gwh, of which 92.4 percent was of hydraulic origin, equivalent to 751,000 barrels of oil daily.

Installed generating capacity increased 11.8 percent in 1980, from 28,386 megawatts to 31,735 megawatts.

The figures that confirm a lower growth rate of demand for energy in 1980 and 1981, together with increased domestic production of petroleum and carburetant alcohol, explain why the nuclear program must be dressed up in a new way: justifying it as an indispensable source of additional energy production is no longer enough.

#### Germans Dominate NUCLEN

Transfer of nuclear technology is one of the most hotly debated points of the Brazil-FRG nuclear agreement. It becomes controversial when it is confirmed that in the major Nuclebras subsidiary, NUCLEN [Nuclebras Engineering, Inc], responsible for reactor engineering, the two major management boards--Technical and Commercial--are represented by KfW [Kraftwerk Union, AG], German firm associated with NUCLEN.

Although having only 25 percent of the capital, the minority stockholders have veto power and all important decisions must be made unanimously. There is, furthermore, a Technical Council, which includes only one Brazilian. A nonvoting member, at that.

#### Lack of Power

This disproportionate power in the Brazilian company is what led some well-known experts of the sector to quit as NUCLEN superintendent: Sergio Brito, David Simon and Joaquim de Carvalho, the latter now one of the severest critics of the Brazilian Nuclear Program and the Brazil-FRG Nuclear Agreement.

Regarding technology transfer, the points raised by analysts of the sector remain unanswered by Nuclebras. One question is the high price Brazil would be paying to buy the FRG reactors, inasmuch as costs paid for engineering services in Angra dos Reis plants 2 and 3 are nearly \$800 million.

This amount represents \$320 per installed kilowatt. The \$800 million would be paid to NUCLEN by FURNAS [Furnas Power Companies, Inc], although it is not known how much of the total will go to the FRG and how much to Brazil.

Still analyzing the high price, some nuclear scientists estimate that Brazil will pay \$20 billion of the \$30 billion that will be paid for the eight German power stations, as they contend that Brazil would spend \$10 billion to generate the same power from nuclear [sic; hydroelectric?] plants, at a price of \$1,000 per installed kilowatt, compared with \$3,000 for nuclear power. The analysts cite Japan in saying that 32,000 contracts for purchasing nuclear technology, made between 1950 and 1978, cost the country \$9 billion.

Some former Nuclebras directors also have reservations about the agreements for the German technology Brazil intends to procure. Gen Dirceu Coutinho, for example, when leaving the NUCLEN superintendency, denounced the fact that Brazil has adopted the centrifugal-jet process, whereas the alternative would be ultracentrifugation, even if developing the technology in Brazil.

According to the general, the price of enrichment by centrifugal jet would be over \$400 per unit of work, whereas the world price was \$100 per unit of separating work. The process denounced by Coutinho, in addition to being expensive, is a big user of electrical energy.

Brazil, the scientists recall, developed the process of ultracentrifugation through the Institute of Nuclear Engineering. The group was disbanded after the agreement with the FRG was signed. The scientists recall that Brazil could even have developed the centrifugal-jet process along with the Germans. This group, which also worked on the chemistry of plutonium, was dissolved, causing research on fast-breeder reactors to cease.

There are still some persons in the government who are fearful about technology transfer. Jose Israel Vargas, secretary for science and technology, for example, finds that the concept of the reactor through the primary heat-exchange circuit--or the philosophy of the project, as it is frequently called--is not open to discussion. All the economic and technical controversies of this phase have been sealed from the public. They are not necessarily kept a secret, but they are beyond the reach of practical action. The visible part consists of the external aspects, more those of marketing than of technology.

# CALS TERMS NUCLEAR PROGRAM SOVEREIGN, PEACEFUL

Rio de Janeiro JORNAL DO BRASIL in Portuguese 23 Sep 81 p 17

[Text] Development of the Brazilian nuclear program adheres to two basic criteria: national sovereignty and technology absorption. But the government affirms the atom will be used for peaceful purposes. That was the declaration of Mines and Energy Minister Cesar Cals yesterday in response to whether purchase of eight nuclear reactors from the FRG continues to be for energy purposes (as the nation now has surplus energy) or military purposes.

The mines and energy minister was in Angra dos Reis to observe the concluding work to load the reactor core of the first nuclear plant there with 121 fuel elements purchased for \$30 million. Cals said the program will cost the country between \$25 billion and \$26 billion, including the fuel cycle, rather than the \$18 billion announced by Nuclebras President Ambassador Paulo Nogueira Batista.

## 'Fair Price'

"Technology absorption is a question of sovereignty. The country that does not utilize nuclear energy will remain forever dependent upon other countries," the mines and energy minister said. He added: "The price being paid is the necessary price to acquire nuclear technology."

Cals further reported that the Itatiaia uranium-enrichment complex in Ceara to be developed by Nuclebras "is likely to pay for all the nuclear technology the country buys; it will be finished in the 1990's and will cost about \$5 billion." Several companies, he said, are already interested in becoming partners in developing the project.

Some foreign companies (he did not say which ones) are willing to finance the project's nuclear phase--extraction and enrichment of uranium--and Brazilian firms are interested in producing fertilizer from the phosphates associated with the uranium in the Itatiaia reserves. The mines and energy minister also intends to install a nuclear plant there to supply power for the whole mining project.

## Necessity

Cals declined to draw a significant parallel for the nation between nuclear power plants and the Itaipu hydroelectric facility. The latter, according to its



president, General Costa Cavalcanti, was built for \$700 direct cost and \$1,000 indirect cost per installed kilowatt. Cals said only that both are needed: the Itaipu hydroelectric plant to provide energy for the South and Southeast regions and the nuclear reactors to provide mastery of the technology.

The mines and energy minister does not believe this technology can be acquired at a slower pace, as 20 years "is a very short time. It took us 25 years to master the technology of thermoelectric power plants," Cals recalled.

In order to acquire the technology of the whole fuel cycle, Cals said, contracts are being signed with several countries. The technology for uranium concentrate is French; enrichment is being developed by the Nuclear Research Institute in Brazil; "zircalloy," a moderating ingredient for nuclear reactions, is Argentine; the reprocessing plant will be German and the technology for developing the superregenerator reactors will be Italian.

#### Reactor Core

Loading the reactor core was finished at 1524 hours yesterday, after 121 fuel-element rods were placed in the core. The operation took 63 hours and began at 0004 hours Sunday. It took only 6 minutes to transfer the first fuel element, which has a primary neutron source, from the fuel storage building to the reactor. Everything had been prepared in advance.

Post-loading and pre-criticality tests will begin immediately and should last 63 days. During this time the pressure and temperature of the primary circuit will be raised to normal conditions. After loading and after it has begun to heat up comes the phase in which the reactor will be brought to "criticality" [capability of sustaining a chain reaction], generating nuclear heat for the first time, which will probably take place about the middle of November.

The plant will not be declared in commercial operation until it reaches 100 percent of its nominal generation of 626 megawatts. At the beginning of December the plant will begin to function, generating energy for the Southeast system at a 10 percent level, gradually reaching 100 percent of capacity and then operating normally at 70 percent of capacity. The first Angra dos Reis plant is to be reloaded 1 year and 6 months after it begins operating.

The plant's pre-operating tests are being conducted by 200 technicians, divided into 4 shifts. They include, besides the director general and four supervisors, fuel specialists, nuclear physicists, chemists, maintenance technicians, personnel specializing in radiation protection, in quality assurance and from the National Nuclear Energy Commission, the International Atomic Energy Commission, ELETROBRAS [Brazilian Electric Power Companies, Inc], Nuclebras and FURNAS [Furnas Power Companies, Inc].

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CSO: 5100/2007



**MALAYSIANS PROPOSE JOINT URANIUM PROSPECTING IN MALAYSIA**

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 29 Sep 81 p 37

[Text] Brasilia--Lew Sip Hon, Malaysian deputy minister of industry and trade, will come to Brazil next month at the head of his country's first official mission to Latin America. He will discuss with authorities of the respective sectors matters related to coal, petroleum and the technology of carburetant alcohol, and will sign a contract with the Mineral Resources Prospecting Company to prospect on Malaysian territory for uranium and other minerals. This was reported to O ESTADO DE SAO PAULO yesterday by diplomatic sources allied with the energy sector.

The deputy minister's party will include 14 businessmen, including some from Singapore.

Subjects related to agriculture and fertilizers will also receive the group's attention, but they are most interested in learning how Brazil can help them in the field of energy, 80 percent of which in Malaysia comes from petroleum. There is also interest in absorbing the technology of methanol for fuel production and of charcoal in producing ferroalloys.

In the case of uranium, Malaysia wants the Mineral Resources Prospecting Company to begin exploration as soon as possible, as there is proof that their country is rich in this ore, based upon earlier studies by Japanese companies. Should discussions on this subject bear fruit, Nuclebras may sign agreements for training technicians in Brazil, similarly to various plans for cooperation in this sector the Brazilian Government has signed with other countries.

In regard to petroleum, although Malaysia produces about 200,000 barrels a day, officials of that country consider it "imperative" to seek renewable-energy sources as a way to reduce their crude-oil imports. They intend to make agreements with Brazil in this area, on terms to be discussed during the mission's visit.

Brazil's exports to Malaysia are not very diversified. Processed and manufactured goods have been the major portion, although only 0.05 percent of the nation's exports. Brazil sells small-sized machinery and raw sugar, and buys rubber and some derivatives. At the end of 1980, their reciprocal trade was only \$18.5 million.

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CSO: 5100/2007

## KWU SAYS NUCLEAR PROGRAM TIMETABLE NOT BEHIND SCHEDULE

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 29 Sep 81 p 27

[Text] The FRG-Brazil nuclear program "is coming along quite nicely" and, despite the delays at the Angra 2 and Angra 3 power plants, it can be said that "the rate at which the Brazilian government has been conducting it is within the prescribed timetable," engineer Wolfgang Breyer said in Sao Paulo yesterday. He is on the Technico-Scientific Relations staff of Kraftwerk Union, AG, the company responsible for selling equipment and transferring nuclear technology to Brazil.

Breyer does not think the Brazilian government has any intention of delaying the program's implementation. In regard to the proposal made to President Figueiredo by cabinet ministers Cesar Cals, Delfim Netto and Danilo Venturini for making the program contingent upon actual transfer of nuclear technology, Wolfgang Breyer believes that, if accepted by the government, "it will in no way change the pace of installing nuclear power plants in Brazil." Subordinating progress of the nuclear program to technology absorption would imply greater flexibility, according to specialists of the sector, who feel that imposing this condition would permit the government, on the pretext of technology absorption, to slow down the rate of the program's implementation.

The KWU consultant, however, believes there is some redundancy in the suggestion made to President Figueiredo (some months ago). He argues that the FRG-Brazil program, with the eight nuclear power plants, was conceived to transfer technology and give Brazil total independence. "Hence, to the extent that the nuclear power plants are built, the degree of technology absorbed is constantly greater, so that when the last plant is completed Brazil will have complete control of the technology," he adds.

## Lost Time

Wolfgang Breyer devoted a good portion of the interview he held yesterday to the FRG nuclear program, which, after some delays, now seeks "to make up for lost time." In this decade alone, he asserted, the capacity of nuclear power plants in Germany must increase more than 150 percent, from 9,000 megawatts in 1980 to 25,000 megawatts in 1990. This goal will be reached upon completing construction of 10 power plants and 5 others "in an advanced stage of licensing."

However, the five plants to which Breyer refers have been "in a final stage of negotiation for licensing" for several years. Now, he remarked, the FRG Government

is revising the licensing process for the purpose of reducing delays and hence the cost of investment. Kraftwerk Union was forced to reduce production personnel by 40 percent at the beginning of this year due mainly to delays in its nuclear program, cancellation of the program with Iran and delays in implementing the Brazilian program.

Kraftwerk Union, says Breyer, "is optimistic about nuclear energy, as the 10 plants now being built in the FRG represent an installed capacity greater than the total now generated by the 14 plants already existing in the country."

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CSO: 5100/2007

## BRIEFS

CNEN CONTROL OF RADIATION--Brasilia--Within a 15-kilometer perimeter around the Angra dos Reis nuclear power plants is where serious accidents involving radioactive contamination can potentially occur. Control of this area will be the exclusive responsibility of the National Nuclear Energy Commission (CNEN), which made studies taking into account topography, wind direction and water resources. Government technicians who commented on the subject in Brasilia yesterday said permission to operate the plants will depend upon information about the possibilities of contamination within that perimeter. Beyond the limit established by the CNEN, control will be the responsibility of the Special Secretariat for the Environment [SEMA], which is to submit by 10 October suggested supplemental rules for making periodic surveys about the indirect effects of radiation. In Angra dos Reis SEMA will act through the Rio de Janeiro environmental control agency, the State Environmental Engineering Foundation (FEEMA). Technicians of this agency will work mainly in analyzing products intended for human consumption, especially milk and garden vegetables. According to the same sources, the CNEN has arranged for a complete survey of the current situation of environmental resources within the 15-kilometer perimeter around the plants. These data, such as water temperature and radiation indices in ocean fauna, will be used as a parameter for the analyses to be made after the nuclear plants begin operation. [Text] [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 29 Sep 81 p 37] 8834

CSO: 5100/2007

COMMENTARY CRITICIZES U.S. NEUTRON BOMB DECISION

PY152221 Santiago Chile LA TERCERA DE LA HORA in Spanish 5 Oct 81 p 2

[Commentary by Oscar Pinochet de la Barra: "An Indispensable Nuclear Agreement"]

[Text] After a series of alternatives that were closely followed by international public opinion, U.S. Secretary of State Alexander Haig and Soviet Foreign Affairs Minister Andrey Gromyko decided to call an end to their war of words--which reminded us of the shouts and gestures of Japanese theater--and hold a meeting in New York, taking advantage of their presence at the UN General Assembly.

For those who still believe in the UN's effectiveness, this was an encouraging meeting. It is obvious that the importance of this meeting goes beyond the sphere of the United Nations. It is clear that the superpowers will once again try to achieve an almost impossible deed: to arrive at an agreement that will establish nuclear balance.

It is very difficult to negotiate with the Soviet Union over arms limitations. It is well-known, and the communists do not deny it, that one of the goals of Marxism is to spread this ideology to all countries so as to free workers, so they say, from capitalistic materialism and its abuses thus complying with one of the most highly sought objectives of Lenin and Marx.

This is why all arms limitations negotiations seem to be a mere pause until the world is in a proper condition to take another step--either peacefully or not--to achieve this ideal.

In view of this it seems almost naive that in tedious and endless meetings the Western world is constantly trying to achieve agreements that are tacitly accepted by the parties but that are difficult to control.

But the other alternative is war and today this means a nuclear war.

Carter and Brzezinski were not clever in dealing with the Soviet Union and they left the impression in the United States of having acted too naively while the USSR took advantage of this to arm itself to its teeth. Reagan and Haig went to the other extreme and decided to express their arrogance--which is also naive--to negotiate on a more firm basis.



But regrettably on 8 August the White House announced that the United States would build the neutron bomb. In this regard a large part of the Western world has maintained a guilty silence that has helped to show the moral decay of a so-called Christian world that is willing to trample over, or look the other way, when human life--the most valuable work of God--is trampled over.

To appease our conscience it has been said that the neutron bomb is more benign than the "regular" atomic bomb since it is capable of killing many people but causing minimum harm to buildings. The immediate reaction to this statement is that the neutron bomb is less "harmful."

There is in all of this moral perversion which is hard to admit but that sums up all of our evils: No one cares about man if all the houses are saved.

In this war of threats, President Reagan said on 2 September that the United States is willing "to launch an arms race that the Soviets cannot win." How about misery and hunger?

Fortunately, the Haig-Gromyko meeting has put things at the proper level: the level of negotiations, of respect for the adversary and respect for the rest of humanity.

It is true that negotiating with the Soviets demands a shrewdness and ability that not all presidents or ministers are obliged to have. But it is also true that the Soviets speak by pounding their fists on the table--good manners are a bourgeois ailment--and they must be answered likewise. But threats, or even worse, pushing the world to a nuclear war is another thing.

Speaking to "statesmen and military leaders," Pope John Paul II referred to the Hiroshima bomb with words of peace. The pope was touched when he visited Hiroshima. Has President Reagan ever been there?

CSO: 5100/2014

# VENEZUELAN ELECTED VICE PRESIDENT OF IANEC

Caracas EL UNIVERSAL in Spanish 14 Sep 81 p 2-21

[Text] The 12th meeting of the Interamerican Nuclear Energy Commission [IANEC] in La Paz, Bolivia has concluded. Venezuela was elected to the vice-presidency of IANEC and a member of the Advisory Committee of the nuclear organization.

The 12th meeting of the Interamerican Nuclear Energy Commission which was attended by 16 countries from the region, unanimously elected the Venezuelan Julio Cesar Pineda, executive secretary of the National Council for the Development of Nuclear Industrial Development (Conadin), as vice president of IANEC for a period of 2 years. The Venezuelan official also became a member of the advisory committee of this American organization which includes seven people, selected for their personal qualifications, their ability and their knowledge of the nuclear field. Julio Cesar Pineda, a lawyer and internationalist, with a rank of consultant minister in the Ministry of Foreign Relations and currently on assignment in the Ministry of Energy and Mining, has held diplomatic posts in Geneva, Mexico and in Moscow where he was the charge d'affaires after the departure of the ambassador, Regulo Eurrelli Rivas.

IANEC is the specialized advisory organization in the development of atomic energy on the American continent, and is comprised of all of the members of the OAS countries.

During this 12th Conference, held in Bolivia, IANEC put forth its program for the decade of the 80's, placing special emphasis on the development of the nuclear-electric programs in the region, and it supported the programs of prospecting and exploration for uranium, the development of nuclear technology and radiation protection and the perfecting of systems of nuclear information. Also considered was that which related to programs of human resources and assistance to countries in the preparation of standards and laws related to the various demonstrations of the peaceful uses of nuclear energy.

At this same meeting of IANEC, the nuclear commissions of the Andean countries signed a joint declaration for the purpose of promoting subregional programs of cooperation and to establish support mechanisms in the nuclear development of the subregion. Venezuela was ratified as the coordinating country in the Andean area for nuclear activity during the present year. The Venezuelan delegation to this 12th meeting of IANEC was composed of Dr Julio Cesar Pineda, executive secretary of Conadin; the internationalist, Mercedes Alegrett; the airforce captain, nuclear engineer Luis Hartman; and the charge d'affaires in Bolivia, Marco Tulio Castellanos.

At this conference, Venezuela confirmed its position regarding the peaceful use of nuclear energy and the necessity of considering alternative energy sources, the conservation of hydrocarbons, the condemnation of the proliferation of all nuclear arms and regional assistance and cooperation for regional development, both in the nuclear-electrical aspects as well as in the varied utilization of the atom in medicine, agriculture, research and industry.

The countries which comprise the new Advisory Committee of IANEC are Argentina, Colombia, Chile, Peru, Uruguay and Venezuela.

The presidency of IANEC will be in the hands of Bolivia until the next conference in 1982 which will be held in Uruguay.

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CSO: 5100/2001

BRIEFS

UNIVERSITY TO GET ATOMIC ACCELERATOR--The UAE University is to receive a cyclotron (an experimental atomic accelerator) from the International Atomic Energy Agency, Dr Mohamed Amiri of the university's science faculty announced last week. Dr Amiri represented the UAE at the IAEA's nuclear energy conference in Vienna. Dr Amiri added that the IAEA had also agreed to provide the university with isotopes for research work and had agreed to grant six scholarships for physics graduates from the university to study nuclear physics in scientifically advanced countries. [Text] [Paris AN-NAHAR ARAB REPORT & MEMO No 40, 5 Oct 81 p 5]

CSO: 5100/4703

JUELICH DIRECTOR ON NEED FOR NUCLEAR POWER

Bonn VORWAERTS in German 17 Sep 81 p 21

[Interview with Wolf Haefele, director of Juelich nuclear research center, by Nikolaus Piper: "What Is Meant by 'Progress' Now"]

[Text] Professor Dr Wolf Haefele is the director of the Juelich nuclear research center. Since 1960, he has played a decisive role in the development of the fast breeder reactor and is one of the most outspoken proponents of nuclear energy. In 1980, he was a member of the Bundestag fact-finding commission on "future nuclear policy" which proposed that the decision on large-scale use of the fast breeder be held in abeyance until 1990.

VORWAERTS: Professor Haefele, you are a professed proponent of nuclear energy. But as a member of the Bundestag fact-finding commission you agreed to the compromise decision providing for the option of turning our backs on nuclear energy until 1990. Would you call that a contradiction ?

Haefele: I think it was a sound decision, based on common sense and reciprocal political responsibilities. The compromise provides for all those aspects of the nuclear energy program to continue that actually can continue: the many light water reactors, the fast breeder prototypes in Kalkar, the high-temperature reactor in Schmehausen and a reprocessing plant. Nothing else is operational anyway. Nonetheless, we must also be laying stress on energy conservation measures. In an operational sense, it really does not make any difference during the next 10 years whether we decide in favor of one type of energy or the other. But in 1990, we will be able to say whether we want to let nuclear energy stand as is or whether we want to initiate a new phase of second-generation reactors and nuclear technology.

VORWAERTS: What is the political rationale for this compromise ?

Haefele: It kept us from voting eight to seven against nuclear energy. It was like the Austrian referendum that turned down Zwentendorf by 50½ to 49½ percent without really resolving the nuclear energy question— because the issue has not been laid to rest in Austria, either.



VORWAERTS: The CDU/CSU opposes the compromise, saying that the need is not so much for fact-finding as for decisions.

Haefele: There is something to that; but this was not the task assigned to the commission. The decision can only be made by the governments concerned. And in this respect the federal government and the Land governments must not only make decisions but also be in a position to implement them.

VORWAERTS: Even if such decisions are diametrically opposed to the commission's findings ?

Haefele: The commission has laid out what the implications are if a decision is made in favor of one option or the other and at what point a real decision on matters of substance must be reached. But this has nothing to do with the light water reactor issue for example where a political debt would have to be discharged and decisions would have to be implemented.

VORWAERTS: The second part of the compromise dealt with the implementation of real conservation measures.

Haefele: I am glad to see you put it that way. To be sure— nuclear energy is one part of it. The fact-finding commission was astute enough to add the energy-saving measures to it as being of equal importance.

VORWAERTS: The only thing is that real savings in energy are not as easy to document as the construction costs of a nuclear reactor.

Haefele: Exactly. That is why we said that we must first save energy for 10 years before we can tell whether it is politic to rely on such measures to some extent or not. I do believe it will take 10 years for us to find out what the advantages of energy conservation are. By the same token, nuclear energy will offer us some advantages over the next 10 years as well.

VORWAERTS: Then you also believe we have 10 years to make up our minds about the fast breeder ?

Haefele: That is the other side of the coin. We are not talking about the SNR 300 in Kalkar; that is just a prototype. What we are talking about is whether we want to go on to large-scale projects and build several high fuel cycle breeders and all the rest.

VORWAERTS: But you seem to think that we are already in a position to jump into breeder technology now.

Haefele: Yes; that is my personal view.

VORWAERTS: And you also think that both the reprocessing and the waste disposal problem can be solved ?

Haefele: Yes. Reprocessing brings technical experience to bear that can only be gained, if one really builds a plant. There is always talk about waste disposal being an unsolved problem; but the real unresolved question is what technical methods to employ to dispose of the wastes. Once these methods are established—which is a political decision—technology can abide by these methods at fairly great expense. The problem is a political one.

VORWAERTS: But there were some very tangible problems that came up in the Gorleben debate.

Haefele: "How safe is safe enough," as the saying goes. There is no technical answer to that question; only a political one. This is another way of saying: is a 10 billion to one risk of accident too great or is it not; this has to be looked at from a political point of view.

VORWAERTS: Can you answer the question to your own satisfaction?

Haefele: I would say so. To my mind, an accident probability of  $10^{-7}$  per year—even if there were severe consequences—is so small that there no longer is a chance of an accident in the true sense of the word happening. But you put a question to me personally. There are other people beside me, however.

VORWAERTS: Your name is more or less synonymous with a certain optimism as regards nuclear energy. Has the anti-nuclear movement shaken that belief of yours?

Haefele: No—and I am not just blindly reiterating my position. These doubts concerning nuclear energy simply do not convince me personally. I can only explain it to myself, if I view the protest as really reflecting a more profound question of meaning that is not articulated as such. Now that is something I can share because I can see my own children posing new questions of meaning today. But I think they ought to be articulated in other ways than in doubts about the need for energy.

VORWAERTS: In other words, you are also unable to agree with the rational arguments against nuclear energy such as those propounded by Robert Jungk?

Haefele: Jungk's arguments least of all; more likely Mr Meyer-Abich's who also represents a different school of thought. I can communicate with him. I may have different ideas on the subject but I can see why the questions are being asked and have a good deal of understanding for them. After all, Meyer-Abich and I have jointly worked out and put on the table the criteria for the evaluation of energy systems.

VORWAERTS: What about the question of meaning, as far as you are concerned—does it not concern energy as much as anything?

Haefele: The most urgent question of meaning for today is: where is 'ahead' ? For our fathers and the generations that preceded them the question arose from social need which, after all, was a factor contributing to the emergence of the SPD. It is no accident that your newspaper is called VORWAERTS. /Forward/— that meant the improvement of unacceptable working conditions of most of the German people. That is not as obvious today as it was then. To live even more comfortably has become a questionable proposition. On the one hand, the Swedish example is not particularly stimulating and on the other hand, the situation in the southern part of the world is so hair-raising that it may not really be a worthwhile goal to emulate 'Sweden'. The military situation has grown so complex that it is no longer self-evident where 'up ahead' really is. But even if you could visualize an overpopulated globe, pacified by some rigorous political system, where would 'up ahead' be then ? By nature, man is constituted in such a way as to move into the open, to move forward.

VORWAERTS: Well, nuclear energy was related to the promise of almost unlimited possibilities— at least for a time.

Haefele: That is true; and it was not a good thing. It was a kind of euphoria that came out of the war, from America; a continuation of last century which implied that satisfaction is guaranteed as soon as material conditions improve sufficiently. There were studies published then that said how easy everything would be once energy would be supplied free of charge. There was a civilizing euphoria that took hold of nuclear energy then which now has come back to haunt us. It was an historical error.

VORWAERTS: What about today ?

Haefele: In a very real sense, we have a need for energy today; we need a substitute for oil; we need electric power. That has nothing to do with euphoria; it is a painful necessity. But the marriage with euphoria which nuclear energy contracted has cost nuclear energy a lot of support, without a doubt.

VORWAERTS: Will there be another historic compromise between the members of the fact-finding commission who support nuclear energy and those who oppose it ?

Haefele: This commission has made it its business to look into the entire question of costs in much greater detail than the first fact-finding commission. Over the past year, we have also grown more sensitive to the question of costs. We are beginning to realize once again that unlimited funds simply are not available. That is why there will be much more argument than last time; things are going to be much more difficult this time around.

9478  
CSO: 5100/2100

## SPENT NUCLEAR FUEL RETURNED FROM FINLAND TO USSR

## Enviably Waste Shipment

Helsinki SUOMEN KUVALEHTI in Finnish 26 Aug 81 pp 18-21

[Article by Juhani Virkki]

[Text] Strictly speaking, we should not be talking of a nuclear waste train. In practice, however, spent fuel from nuclear power plants is today worthless waste. It is not bought nor do many countries get rid of it even if they pay for the privilege. The Loviisa nuclear power plant is an enviable exception to the rule.

A rise in the value of spent nuclear fuel is pure speculation, but perhaps soon, at the end of 1,000 years of change, the situation we still believed in some 10 years ago will recur. At that time the recycling of spent fuel, by means of reprocessing, back into modern-type or second-generation power plants, the so-called breeder reactors, was considered to be in the process of rapid development.

Now, there are only a few reprocessing plants and even fewer breeder reactors. The number of nuclear power plants has gone beyond the 300 limit and will climb to almost a thousand by the end of the 1990's. Nations that have reprocessing plants are more and more filling their capacities with nuclear fuel from their own power plants and nuclear weapon production.

## 10 Years of Negotiations

Although the latest agreement on the shipment of spent nuclear fuel was signed by Imatran Voima (IVO; Imatra Power Company) and the Soviet Atomenergosexport (AEE) as recently as early June, the matter was in principle already settled in 1970 when the procurement agreement for the Loviisa 1 plant was signed.

"The option on the return of fuel was such that the AEE is ready to either receive — or, as they at that time still ventured to say, 'buy back' — spent fuel or to perform reprocessing services by means of which it would at least recover its nuclear materials from the fuel," said Heikki Vayrynen, head of the IVO Power Plant Department's Nuclear Technology Office.

The same assertions are also included in the agreement signed in 1971, which set the terms for the agreement on both unused and spent fuel. Then came the bilateral agreement between the two countries on peaceful cooperation in the use of nuclear



energy, which posed an obstacle. It stated what Finland may export to the Soviet Union, followed by a comma and "not, however, nuclear material." This obstacle was eliminated in 1975, but it took another 3 years before a record of the principles involved was made of the cornerstone of the final agreement.

"There were two reasons why negotiations did not proceed smoothly. On the one hand, there were still few shipments of fuel to the Soviet Union from abroad and, of course, for that reason too the IVO was prudently cautious as a buyer of service. On the other hand, they knew that the first shipment would not be of current interest before 1981," Vayrynen said.

"As I understand it, the Soviet Union's willingness to get the fuel back remained the same the whole time. Eagerness is, of course, hard to measure when, as we have noted, matters have become all topsy-turvy. The value of the goods dropped to zero on the world market and even to a negative figure.

"As regards the Soviets' attitude, we have the impression that the return of the fuel is a matter of principle for them. We know that the matter has been presented as an outright demand to many other countries. This is naturally a way of guaranteeing surveillance over the diffusion of materials that might be used for nuclear weapons."

#### Agreement Involves Number-One Reactor

The current IVO-AEE agreement involves the Loviisa-1 plant and covers its entire lifetime, or still a good 20 years. The next shipment will be next year, but the following one will not be before 1985. This is because the storage time for spent nuclear fuel at Loviisa has been extended from 3 to 5 years. In the background there are technical reasons: This year fuel elements that have to be removed from the reactor will have been in the reactor for the maximum-allowable time, or 3 years. Because of their greater radioactivity and heat energy, there is good reason to extend the storage time.

Shipment of reactor number two's first exchange consignment will not become a matter of current interest until 1984. The agreement that is to be made before then will be honed down in the light of this and next year's experiences. At the same time it will be agreed on whether one big or two small shipments a year are to be made at the end of the decade. Each reactor produces 14 tons of spent fuel a year.

The first shipment meant 3 weeks of working with three shifts for the IVO. "We estimate that we need a minimum of 2 and 1/2 weeks. The rolling stock was provided for 5 weeks because the Russians estimated that we would need that much time," Vayrynen said.

The rolling stock was received in Viipuri on 29 July. It included two locomotives which were switched coming and going in Vainikkala, four fuel-transport cars, two accompanying cars with safety equipment for the shipping containers and room for the crew, two empty buffer cars and a caboose for the IVO's own communications and other equipment. The IVO's own highway equipment was used between the railroad station in Loviisa and Hastholmen.



"Slight radioactivity in one of the shipping containers and a breakdown with some of the highway equipment delayed the operation for maybe a couple of days. This time too, the safety precautions were perhaps stricter than usual. The work moves very slowly since the containers can only be handled one at a time. Furthermore, the containers require a couple of days for the temperature to come down before the return trip can begin."

#### 5 Million Fuel Buttons

So, 3.5 tons of spent fuel that was removed from the reactor in 1978 were placed into each shipping container. In a filled reactor there are 349 fuel elements. Each element is a hexagonal steel tube containing 126 3-meter-long fuel rods and there are 126 "fuel buttons" in each rod, altogether over 5 million.

Over 95 percent of the spent fuel is natural uranium. The rest is divided up among uranium isotope U-235, which is essential to a nuclear reaction, plutonium and so-called products of fission. There were about 140 kg of U-235, perhaps about 70 kg of plutonium and about a half a ton of these extremely radioactive fission products in the 14-ton consignment shipped from Loviisa, which is why safety precautions were needed.

After 3 years of storage, the fuel's heat energy and radioactivity had dropped to about one one-thousandth of what it was. The material was nevertheless still very dangerous: "We would never even think of shipping fuel without thick containers. In its proximity you would get a lethal dose of radiation in just a few seconds," Vayrynen said.

At Loviisa spent fuel is stored in water cisterns several meters deep. The shipping containers are also filled and sealed in water.

"Practically speaking, the water in the Loviisa cisterns is pure and this time too we confirmed the fact that the shipping containers did not introduce any radioactivity into it. At the time the surface of the containers was inspected even before the water was removed and the containers filled with nitrogen."

#### "There Are All Kinds of People"

In the opinion of the news media and through them the public, the shipment set in motion from Hastholmen on the 17th was kept annoyingly secret. As far as the IVO is concerned, Heikki Vayrynen regards the matter in this way:

"In our planning we started with the assumption that a shipment of dangerous material is not a dangerous shipment. Thus advance notification of the public was not necessary. For the news media the fuss was over being in a state of emergency readiness in the event that something unexpected should happen, and this was not even unexpected.

"We had three plans: a shipment, an accident readiness and a security plan. The security plan was the only one announced to be secret, naturally — otherwise it would have been worthless. By international standards there is really no rule governing secrecy, but we felt that openly informing the public would have taken the teeth out of our security precautions.

"We also wanted to keep the time of shipment secret and then it became such a hot news item that the matter itself took second place. But anyone who wanted to know would go and see when the train was leaving and then even run alongside it. The fuss over secrecy is much less of a bother than some other kind of fuss.

"The world is full of all kinds of people. A couple of hundred ordinary citizens at the railroad station in Lahti, for example, don't worry us, but just one psychopath is too much. He would hardly be capable of doing any real damage, but he could nevertheless cause a fuss so that, in spite of everything, the train would be in danger. Or someone might chain himself to the rails to draw attention to himself...."

The VR [State Railways] had planned a night schedule for the rail shipment, the reason for which was that the train should not run into any rolling stock or other sensitive shipments. At night it would also be easier to keep watch over the crossings of which, including "cow paths," there were perhaps over 200 along a stretch of less than 500 km.

Vayrynen does not feel that the stretch of track from Loviisa to Lahti is a security risk: "Since the VR has set axle-weight and speed limits and since we operate below both of them, even more noticeably so as concerns speed, there is no cause for fear."

#### Same Objective for Power Plant Number Three

The IVO is also aiming at the same sort of fuel agreement for its future nuclear plants. A feasibility study for the third power plant is right now in progress with the French firm, SOFRATOM [expansion unknown], and its old supplier, the AEE. According to the IVO, there is reason to decide on bids by 1983.

"I would not, however, so absolutely categorically state that the IVO would only consent to an agreement like the present one. The work has barely begun and the partners have been so chosen as to be able to at the same time also map out their abilities to provide services for the treatment of fuel waste," Vayrynen said.

"The best alternative would, of course, be for the waste not to come to us. We are trying to see to it that, if and when we conclude an agreement for the supplying of a power plant, the fate of the spent fuel will simultaneously be decided on too. Thus the matter would not be postponed until the 1990's, when the power plant would be built."

#### Other Waste Stored in Cave

Helsinki SUOMEN KUVALLUSTI in Finnish 28 Aug 81 p 21.

[Text] Nuclear power plants also produce other radioactive material than spent fuel. This so-called power-plant waste is divided into mid and low-level radioactive waste. Mid-level radioactive wet waste — for example, different kinds of filters — accumulates in cleansing the water used in the plant's processing circuits of radioactivity from, for example, corrosive products and materials that may leak from the fuel.

Low-level radioactive waste is dry matter. The protective clothing, bits of board, tools, etc. included in this category are most typically produced in connection with plant annual plant maintenance operations.

Several tens of cubic meters of wet waste and less than 100 cubic meters of dry waste requiring further treatment have so far accumulated. The storage plan has been drawn up on the assumption that, when in time fuel leaks become more common, about 250 cubic meters of wet waste a year could accumulate.

Wet waste is at present stored in tanks on the plant grounds. Dry waste is either baled or put into barrels.

The IVO has a plan ready which includes a so-called plant for stabilizing wet waste with concrete and intermediate storage of the concrete blocks it produces. A decision on the construction of the plant has not yet been reached. This will essentially depend on how fast wet waste accumulates; its current level is considerably lower than what is referred to as normal.

The ultimate storage of waste in concrete blocks in a rock shelter to be blasted into the rock at Hastholmen is also linked with the plan. The suitability of the bedrock was tested a couple of years ago to a depth of from 50 to 120 meters. There is nothing that has become apparent in the plan which might prevent realization of the rock shelter storage facility.

Next June the IVO will submit a so-called site report, in which it is proposed that waste could ultimately be located according to the plan, to the Ministry of Trade and Industry.

The IVO and the Industrial Power Company (TVO), which owns the Olkiluoto power plants, do not feel it very likely that power-plant waste will ultimately be located at a common site in Olkiluoto or Hastholmen or in some entirely different third community.

#### TVO Considers Temporary Solution

Helsinki SUOMEN KUVALEHTI in Finnish 28 Aug 81 p 21

[Text] Each of the Olkiluoto power plants produces 18 tons of spent fuel a year. So far, about 200 cubic meters of plant waste has accumulated in them. At Olkiluoto wet waste has already been "baled" since both plants have bituminous coating plants. TVO plans for the ultimate locating of mid-level radioactive waste are the same as at Loviisa.

The TVO has not succeeded in arranging for the shipping of spent fuel out of Finland. Last year the TVO rejected an English offer for the reprocessing of fuel. They felt that the bid was too high in addition to the fact that it would have covered only a year and a half's accumulation of spent fuel and the so-called reprocessing waste would have been returned to Finland.

The TVO is at present investigating two alternatives. On the one hand, it in principle has an open line to Sweden where the TVO would get a central storage facility, to be built at Oskarshamn in 1985, for the intermediate storage of spent fuel for 25 years.

On the other hand, the TVO is investigating its own alternative, that is, the construction of an intermediate storage facility alongside its plants with a capacity of over 20 years. The present cistern space will be filled by the early 1990's. According to TVO general manager Magnus von Bonsdorff, the alternatives will be decided based on cost. Olkiluoto's current license to operate will expire at the end of 1983. A new license application must be filed next year and von Bonsdorff says that "matters must be settled by then."

The TVO does not expect any new reprocessing bids. Neither of its alternatives are aimed at reaching a final decision for "several decades." There will then be two alternatives: reprocessing or the storing of spent fuel in Finnish bedrock.

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